



PATENT
Atty. Dkt. No. APPM/2981/CPES/EPS/BG

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Reimer, et al.

Serial No.: 09/220,153

Confirmation No.: Unknown

Filed: December 23, 1998

For: Processing Apparatus Having Integrated Pumping System

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

§

Examiner: R. Bueker

CERTIFICATE OF MAILING 37 CFR 1.8	
I hereby certify that this correspondence is being deposited on <u>28 Feb 2002</u> with the United States Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231.	
<u>28 Feb 2002</u>	<u>Mark Ritter</u>
Date	Signature

DECLARATION UNDER 37 C.F.R. 1.132

I hereby declare that:

1. I am an inventor of the above-identified patent application and an employee of Applied Materials, Inc., the assignee of the present patent application.
 2. I have a Master of Science in Mechanical Engineering from the University of Minnesota, and a Bachelor of Science in Mechanical Engineering from the University of Tehran. I have worked in the field of substrate processing for 9 years. I am currently an Engineering Manager at Applied Materials, Inc.
 3. I have read the references cited by the Examiner in the pending application including U.S. Patent No. 5,709,753 to Olson et al. (hereinafter *Olson*); and U.S. Patent No. 5,904,952 to Lopata et al. (hereinafter *Lopata*).
 4. *Olson* teaches a pump with a pumping capacity that is incapable of rapidly evacuating gas from a chamber as is required with the substrate processing apparatus

described in the present application. *Olson* specifies that the pump used is a "Drytel Series dry pump manufactured by Alcatel, Inc." Attached as Exhibit I is a description of these pumps with their operating characteristics provided by the manufacturer. Using the information provided and assuming the pump is used to evacuate a load-lock chamber having a volume of 30 liters, the pump of *Olson* would require at least 3 minutes to pump down the chamber to a pressure of 100mT. The pump of the present invention on the other hand, because of its superior operating characteristics, can pump down the same chamber to the same pressure in as little as 15 seconds. As discussed in the application (page 9, lines 6-8), a load-lock chamber must be evacuated each time a new batch of substrates is placed in or removed from the chamber. This rapid, repeated pump down for a high throughput system like the one described in the application could not be achieved with the pump of *Olson* and there would be no motivation to use the pump of *Olson* in a high throughput setting.

5. In addition to the foregoing, the pump of *Olson* is not really a dry pump but is a combination of a diaphragm pump and a molecular drag pump that does not exhaust gas to atmospheric pressure.

6. *Lopata* teaches a substrate processing apparatus using diffusion pumps and mechanical pumps. While the mechanical pumps are shown near the apparatus in the Figures of the patent, there is absolutely no description of the pumps or of their location in the patent document. The description does make it clear that the process is a CVD process and requires a pump capable of providing high flow rates. Absent some teaching to locate these pumps close to the chamber, design and engineering practice suggests the pumps be located remotely from the chamber as these prior art pumps are too large and noisy to be located near a processing apparatus.

As the person signing below, I hereby declare that all statement made herein are of my own knowledge and are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or

imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of inventor: Pedram Sabouri

Inventor's signature:



Date:

2/27/02

Residence: 1554 Kooser Road
San Jose, CA 95118

Country of Citizenship: USA

T:\Clients\Appm\2981\PTO\2981_Declaration_Under 37 CFR 1132.doc



Kraus Vacuum Pumps

→ Compact dry
pumping systems

DRYTEL series

H
E
I
G
H
V
A
C
U
M
P
U
M
P
E
R

Compact Dry Pumping System

Drytel series

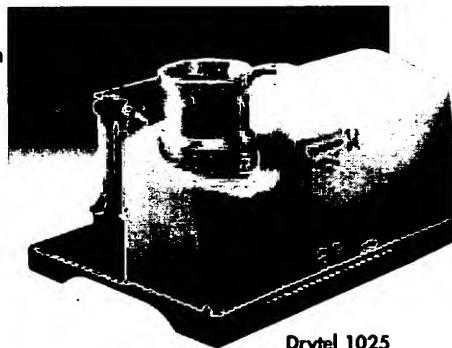
Dry pumping unit

Drytel units are dry pumping systems including an Alcatel molecular drag pump (MDP) and an oil-free forepump. Designed to be used as bench top or easily integrated in a system, these units provide a dry clean vacuum from atmosphere to 10^{-6} mbar/Torr.

Small pumping configuration: Drytel 1025

p 4 à 7

Based on the new "Open Concept", this unique, small and robust pumping system provides a suitable solution for backing turbomolecular pumps or pumping a system down to 10^{-6} mbar/Torr. The Drytel 1025 accommodates a 7.5 l/s drag pump and a 1 m^3/h diaphragm pump in a compact design.

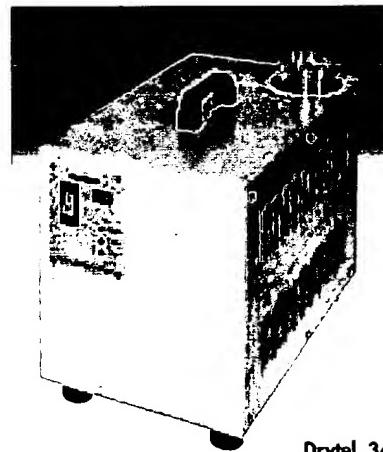


Drytel 1025

Large pumping configuration: Drytel 34 / Drytel 100

p 8 à 11

Already used on numerous types of systems, these units are suitable for all applications which require a fast pumpdown time. The Drytel 34 accommodates a 7.5 l/s drag pump and a 4 m^3/h diaphragm pump. The Drytel 100 accommodates a 24 l/s drag pump and a 4 m^3/h diaphragm pump.



Drytel 34

Applications

Drytel series is recommended for all applications where a dry clean vacuum is required such as in industries (semiconductor, analytical instrumentation, pharmaceutical, chemicals, ...) and in Research and Development laboratories.

They can be used in various types of applications:

- Backing of turbomolecular pump
- Loadlock pumping
- Mass spectrometry
- Surface analysis
- Ion pump evacuation
- Cryopump regeneration
- Calibration bench
- ...



"Open Concept" : a new generation of Alcatel's turbo pumping group...



- OPEN Design
- OPEN Configuration
- OPEN Applications

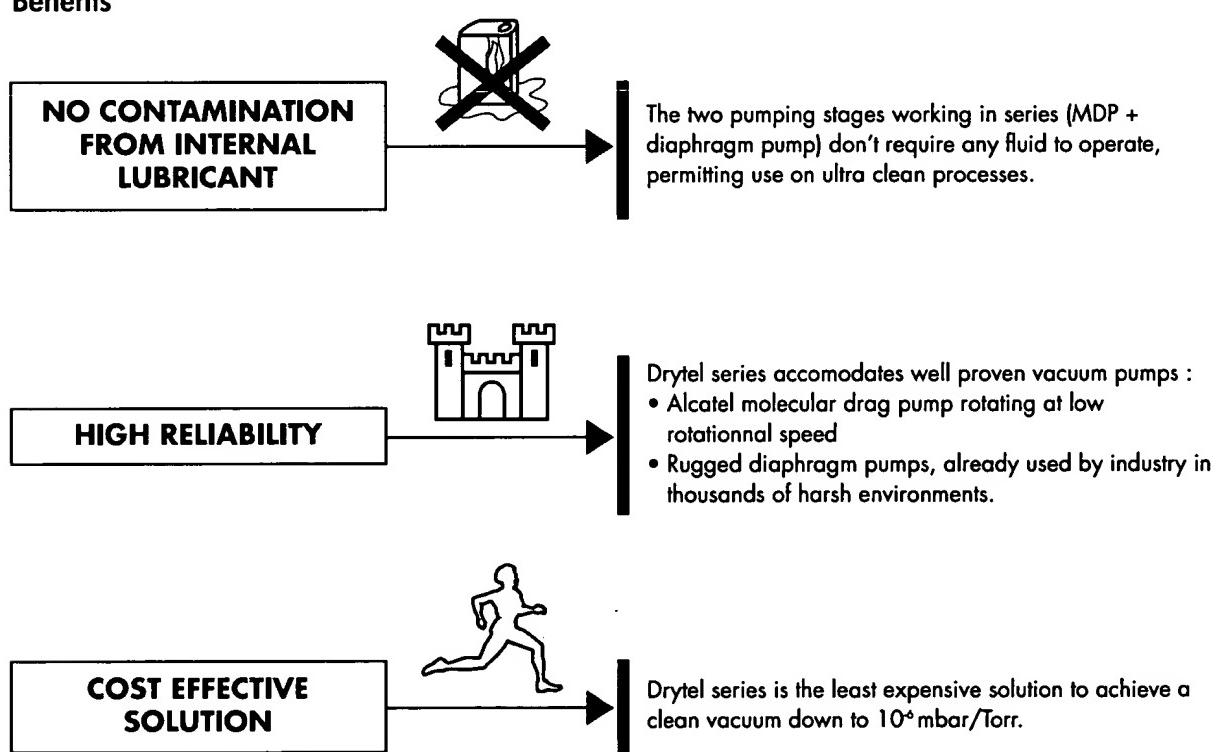
Main advantages of the "Open Concept"

- **Flexible**
possibility to get the most adapted configuration
- **Compact**
- **Easy to maintain**
direct access to the main components
- **Cost effective**

As a part of the "Open Concept" family, the Drytel 1025 has been designed to offer various configurations. Please consult your Alcatel's representative for more information on the available configurations.

High Vacuum Pumps

Benefits



Compact Dry Pumping Systems

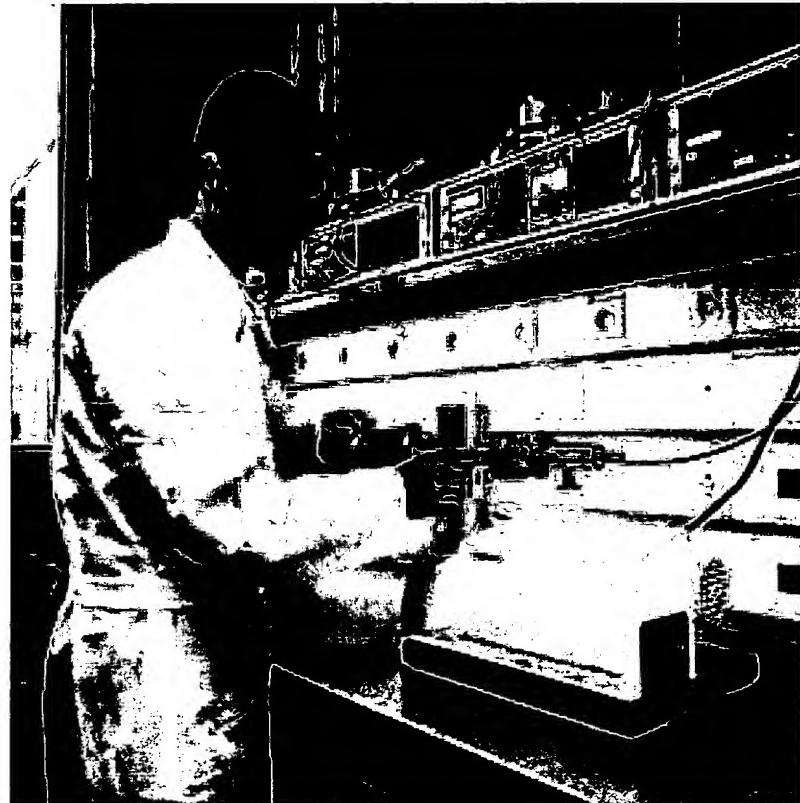
Drytel series

Small pumping configuration: Drytel 1025

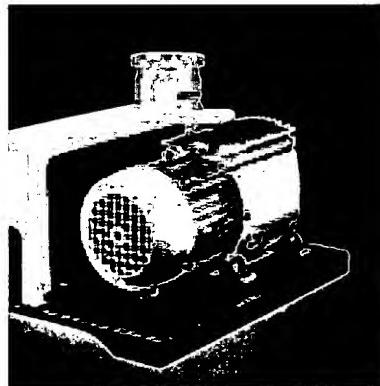
The Drytel 1025 is the first member of a new family based on the "Open Concept".

The Drytel 1025 is a new, small and robust pumping system which provides a suitable solution for backing turbomolecular pumps or pumping a system down to 10^4 mbar/Torr.

It accommodates a 7.5 l/s drag pump and a 1.5 m³/h diaphragm pump in a compact design.



MDP 5011 (7.5 l/s)
integrated on the Drytel 1025



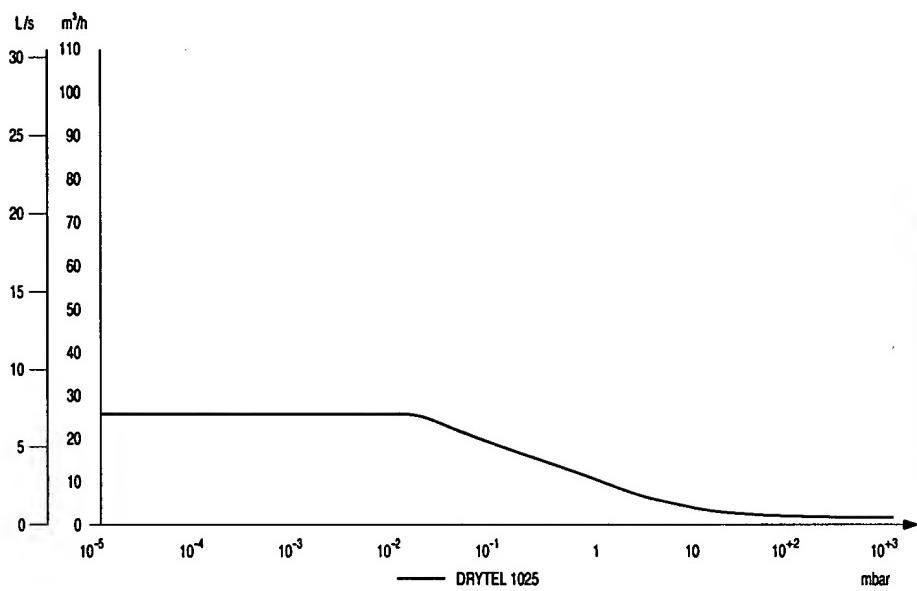
New 1.5 m³/h diaphragm pump

Compact Dry Pumping Systems

Drytel series

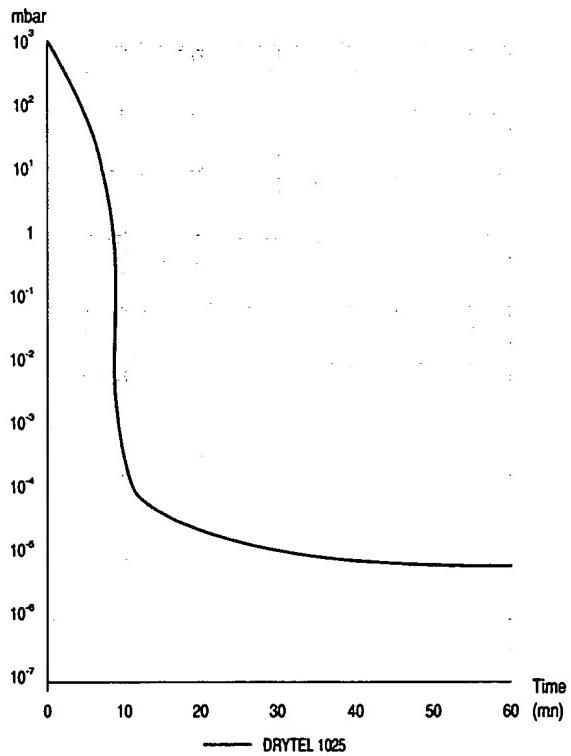
Technical data

Pumping speed / Inlet pressure (N_2)



HIGH VACUUM PUMPS

Pump down curves on a 30 l volume of N_2



Compact Dry Pumping Systems

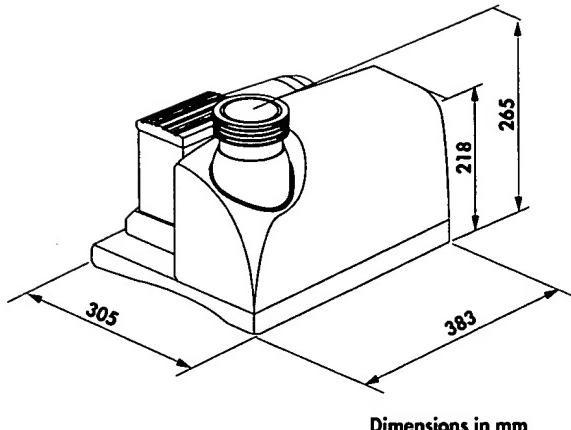
Drytel series

HIGH VACUUM PUMPS

Technical data

	Characteristics		Drytel 1025
Ultimate pressure*		mbar	10 ⁻⁴
Pumping speed < 10 ⁻² mbar*	N ₂ He H ₂	l/s	7.5 4 3
Primary module pumping speed		m ³ /h	1
Exhaust pressure		mbar	Atmosphere
Start-up time		min	2 min
Cooling system			Air
Maximum inlet pressure		mbar	5
Maximum ambient temperature		°C	0 to 35
Maximum power consumption		VA	250
Inlet flange			DN 63 ISO-K
Weight		kg (lb)	15 (33)

* Pneurop measurement



Options and accessories

Options

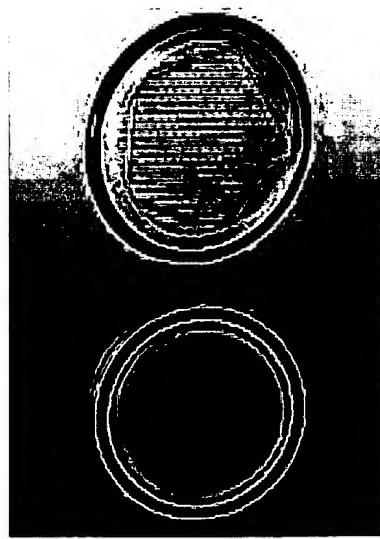
It is possible to fit the Drytel 1025 with several types of options:

- Interface board: allows the remote operation of the Drytel (start/stop and monitoring of the pumping system status),
- Automatic gas ballast: improves the pumping of light gases and reduces the condensation inside the Drytel,
- Exhaust connection: allows the collection of pumped gases to prevent their release to the atmosphere.

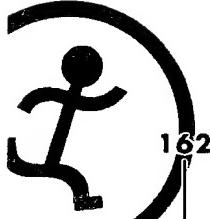
Accessories

Various accessories dedicated to the molecular drag pump can be offered as options. In particular, the inlet screen can be used to prevent foreign material to enter the pump.

Description	P/N
Inlet screen (DN 63) - 2.5 mm mesh	063117
Inlet dust filter 20 µ (DN 63)	062912
Aluminium centering ring (DN 63) special for MDP 5011 (without o-Ring)	063212



Standard & dense mesh inlet screen



Compact Dry Pumping Systems

Drytel series

Ordering information

D025	A	S					0
------	---	---	--	--	--	--	---

	Drytel 1025
Code	D025

	Gas Ballast
Yes	No
Code	L N

	Interface board
Yes	No
Code	P N

	Exhaust
Standard	DN 16
Code	S D

	Tension
110/130 V - 50/60 Hz	200/240 V - 50/60 Hz
Code	7 8

	Cable type			
U.S.A.	France/Germany	U.K.	Italy	Switzerland
Code	1	2	3	4 5

For example
You need ...

Drytel D025
Gas ballast L
Interface board P
Exhaust DN 16 D
110/130 V - 50/60 Hz 7
U.S.A. 1

= D025 A S L P D 7 1 0

Hier Vacuum Pumps

Compact Dry Pumping Systems

Drytel series

Large pumping configuration: Drytel 34 - Drytel 100

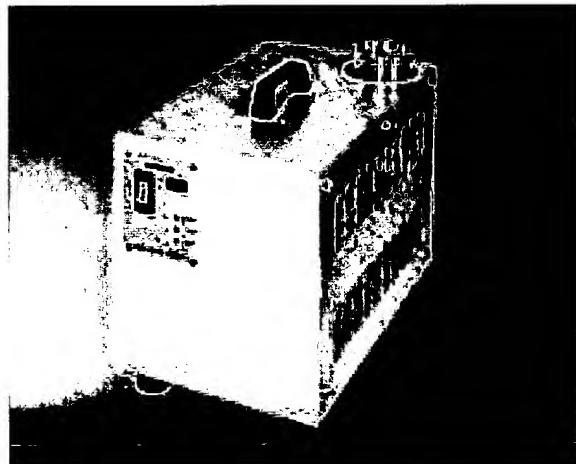
The Drytel 34 and the Drytel 100 provide large configurations for pumping down to 10^4 mbar/Torr at high pumping speed.

They accomodate a 4 m³/h diaphragm pump and an associated molecular drag pump (MDP), according to the requested configuration.

Specific versions are available for corrosive applications ("C" version equipped with a MDP chemical version).

HIGH VACUUM PUMPS

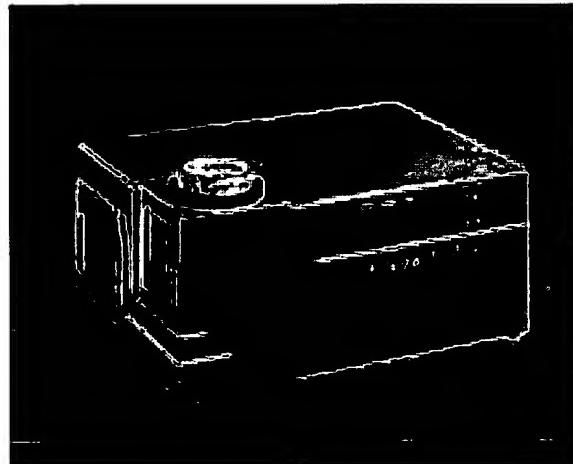
Drytel 34



Drytel 34 equipped with a 7.5 l/s drag pump

450 l/min

Drytel 100



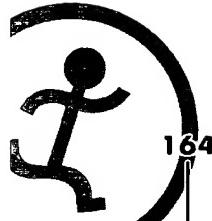
Drytel 100 equipped with a 27 l/s drag pump "C" version

1620 l/min

Technical data

Characteristics	Drytel 34/34 C		Drytel 100/100 C	
Ultimate pressure*	mbar	10^4 / 10^5		10^4
Pumping speed < 10 ² mbar*	N ₂ He H ₂	l/s l/s l/s	7.5 4 3	27 18 15
Primary module pumping speed	m ³ /h	4		4
Exhaust pressure	atm	(10 ³ mbar)	(10 ³ mbar)	
Start-up time	min	2 min	1.5 min	
Cooling system	Air Water		Air Water	
Maximum inlet pressure	mbar	5	5	10
Maximum ambient temperature	°C	0 to 35	0 to 50	0 to 35 0 to 45
Maximum power consumption	VA	575	650	
Inlet flange		DN 63 ISO-K	DN 100 ISO-K	
Weight	kg (lb)	36 (80)	43 (95)	

* Pneurop measurement

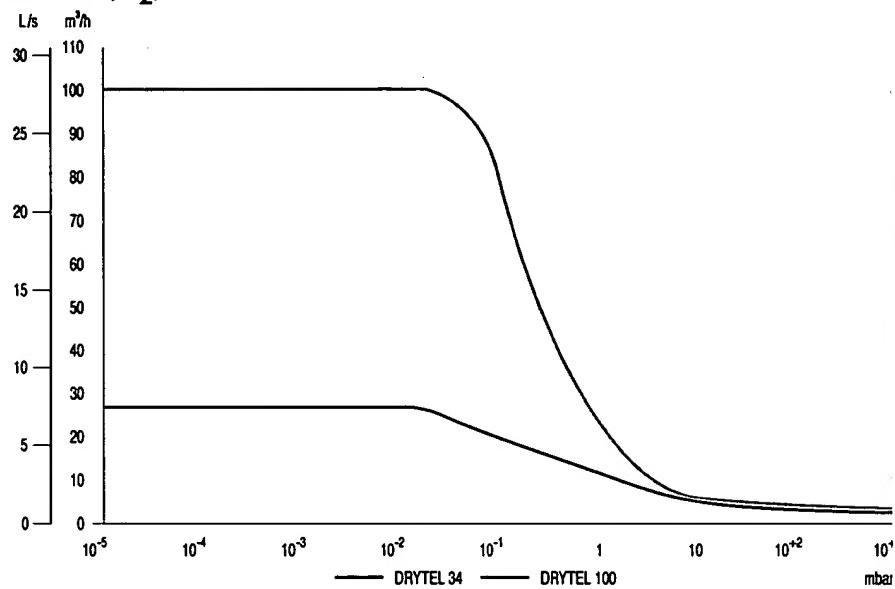


Compact Dry Pumping Systems

Drytel series

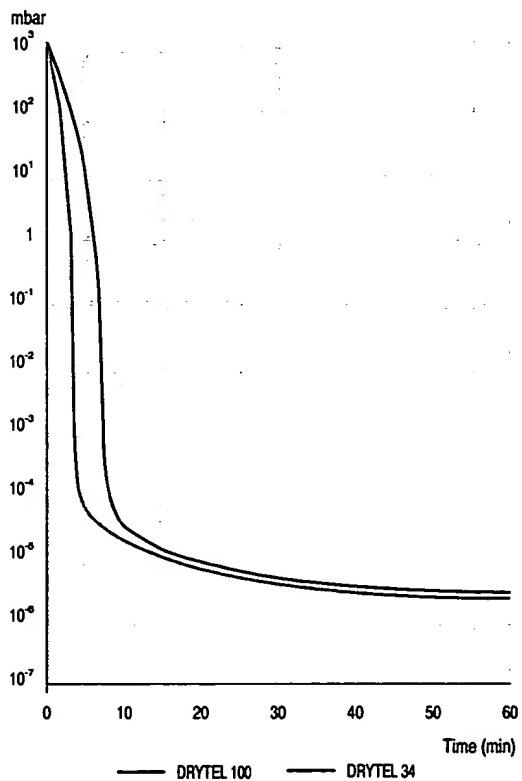
Technical data

Pumping speed / Inlet pressure (N_2)



HIGH VACUUM PUMPS

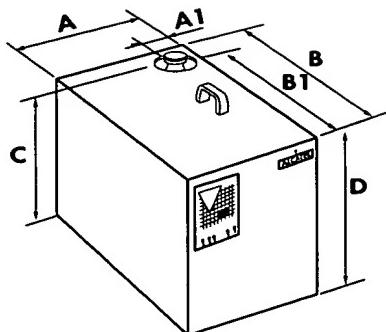
Pump down curves on a 30 l volume of N_2



Compact Dry Pumping Systems

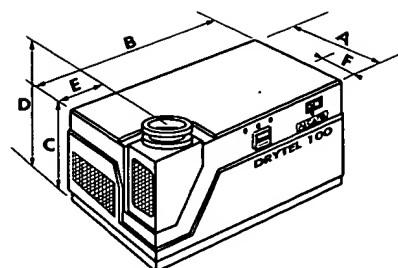
Drytel series

Dimensions



Drytel 34

Model	A	A1	B	B1	C	D
Drytel 34	280	65	450	387	375	345
Drytel 34 C	280	65	450	387	375	345



Drytel 100

Model	A	B	C	D	E	F
Drytel 100	465	625	305	350	99	93
Drytel 100 C	465	625	305	350	99	93

HIGH VACUUM PUMPS

Ordering information

Model	Flange	Cooling	Single phase			
			PART NUMBER			
			230 V (*) 50/60 Hz	115 V 60 Hz	100 V 50/60 Hz	200 V 50/60 Hz
Drytel 34	DN 63 ISO-K	Air	798619	798619	798622	798625
Drytel 100	DN 100 ISO-K	Air	795453	795454	795455	795457
Drytel 34 C	DN 63 ISO-K	Water	795540	795541	795542	795544
Drytel 100 C	DN 100 ISO-K	Air	798614	798620	798623	798626
		Air	795909	795910	795911	795913
		Water	795918	795914	795915	795917

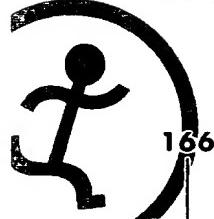
(*) Delivered with European power cord, for other power cords see below

Optional Power Cords

Description	P/N
US power cord for 230 V - 60 Hz	107404
US power cord for 230 V - 50 Hz	107405

Note

The Drytel 34 and the Drytel 100 can be customer specified with additional accessories.



Compact Dry Pumping Systems

Drytel series

Options and accessories

The Drytel 34 and Drytel 100 can be specified with a comprehensive range of additional accessories to meet customer requirements. Options are factory installed: they must be specified when ordering the Drytel. Accessories can be ordered separately.

Improving the performance:

- The manual or electrical (automatic) gas ballast improves the pumping of light gases, or reduces condensation inside the Drytel.
- The standard of dense mesh inlet screen should be used to prevent foreign material to enter the high vacuum pump.

Integration in a system:

- The exhaust connection collects the pumped gases to prevent their release to the atmosphere. If the gases are corrosive, a "C" type exhaust connection is appropriate.
- A separator kit may be used to separate the high vacuum pump from the Drytel.

Control:

The interface kits allow a remote operation of the Drytel (start/stop and monitoring of the pumping system status).

Others:

In any case, please contact us directly if your specific need is not covered by a standard product. We offer product customization and integration of accessories such as valves, gauges, etc...

HIGH VACUUM PUMPS

Drytel 100/Drytel 100 C Options

Description	Drytel	100	100 C	PART NUMBER
Manual gas ballast valve between MDP and dry primary pump (light gases pumping)	●	●		050590
Electrical gas ballast valve 24 V-DC (other voltages on request)	●	●		050580
Exhaust connection (DN 16)	●			050554
"C" type inert gas purge connector (DN 16 ISO-KF) and exhaust connection (DN 16)	●			062979
"C" type exhaust flange extension -		●		050577
Stainless steel / teflon	●	●		062898
Interface control	●	●		062868
Set of 4 casters	●	●		

Drytel 100/Drytel 100 C Accessories

Description	Drytel	100/100 C	PART NUMBER
Set of 4 handles	●		050590
Inlet screen (DN 100) - 2.5 mm mesh	●		050580
Inlet dust filter 20 µ (DN 100)	●		050554

Drytel 34/Drytel 34 C Accessories

Description	Drytel	34/34 C	PART NUMBER
Side (horizontal) inlet kit for MDP	●		050591
Air cooling flow deflector	●		050587
Inlet screen (DN 63) - 2.5 mm mesh	●		063117
Inlet dust filter 20 µ (DN 63)	●		062912
Aluminium centering ring (DN 63) special for MDP (without o-ring)	●		063212

